

# AVIATION

*The Oldest American Aeronautical Magazine*

FEBRUARY 14, 1927

Issued Weekly

PRICE 15 CENTS



Skiers being towed by airplane over Mirror Lake in the heart of the Adirondacks

P. & A. Photo

VOLUME  
XXII

## SPECIAL FEATURES

NUMBER  
7

THE DERULUFT BERLIN-MOSCOW AIRLINE  
SLOTTED WINGS IN PRACTICE  
HUFF DALAND CYCLOPS

GARDNER PUBLISHING CO., INC.  
HIGHLAND, N. Y.  
250 W. 57TH ST., NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office, at Highland, N. Y.  
under Act of March 3, 1879

# Commercial flying in ALASKA



MR. NOEL WIEN

ROUTES followed by Mr. Noel Wien on his Alaska trip, with Fairbanks as his headquarters



## Mobiloil's part in a daring far northern business venture

FLYING over the frozen rivers and rugged mountain peaks of Alaska is far different from ordinary aviation work. But for the past few years it has been Mr. Noel Wien's business to fly with gold prospectors and other passengers to many widely-separated parts of the territory.

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place. I finally landed a few minutes later—my motor still working fine, but the oil supply entirely gone.

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## THE "WASP"

## REFERENCES

## Another "WASP" Success

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File Attachment Name

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Like-wise, in comparable Altitude performances are other outstanding attributes.

Designed around the Pratt and Whitney "Wasp" Engine.

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LONG ISLAND CITY NEW YORK

# AVIATION

THE GARDNER PUBLISHING COMPANY, INC.  
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Vol. XXII

FEBRUARY 14, 1927

No. 7

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Subscription price: Five dollars per year (single copy \$1.00). Single copies may be ordered from the publisher, 250 W. 57th St., New York 19, N. Y.

Second class mailing. Postage paid at New York, N. Y. and at additional mailing offices. Post Office at Highland, N. Y., is authorized as a second class office.

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## With the Editor

Some years ago in aeronautical research circles there was quite an epidemic of discussion on the subject of winged wings, and the possibilities of increasing the lift of airfoils by what may be termed artificial means. Numerous devices, including the Handley Page and Lissauer's slatted wings, were developed, and yet it seems surprising that no firm has actually been able to produce a wing applying this type of wing. Nevertheless, the Handley Page wing appears to have very distinct possibilities and there is no doubt that Mr. Handley Page himself has a great deal of faith in these possibilities.

With a view to starting discussion on this subject, an article on the general features of the slatted wing and description of two successful airplanes, in which the device has been applied, is published in this issue of AVIATION. Structural problems are undoubtedly considerable in the slatted wing principle as the Handley Page wing, but, nevertheless, these appear to have been very satisfactorily solved, and it seems reasonable to expect that further refinements at the slatted wing principle applied will appear in the near future. One of the two examples described in this issue is machine incorporated, not only this new type of wing design, but also the three-engine principle, is of particular interest.







The smallest type of aircraft line service is the Dershaft Line in Moscow. Directors and personnel at Dershaft: 1. Dr. Felix Syrovetskiy; 2. Dr. Gerasimov; 3. Dr. Gerasimov; 4. Dr. Gerasimov; 5. Dr. Gerasimov; 6. Dr. Gerasimov; 7. Dr. Gerasimov; 8. Dr. Gerasimov; 9. Dr. Gerasimov; 10. Dr. Gerasimov; 11. Dr. Gerasimov; 12. Dr. Gerasimov; 13. Dr. Gerasimov; 14. Dr. Gerasimov; 15. Dr. Gerasimov; 16. Dr. Gerasimov; 17. Dr. Gerasimov; 18. Dr. Gerasimov; 19. Dr. Gerasimov; 20. Dr. Gerasimov; 21. Dr. Gerasimov; 22. Dr. Gerasimov; 23. Dr. Gerasimov; 24. Dr. Gerasimov.

The equipment of the Dershaft comprises two airplanes and twenty engines. Eight of these airplanes are used on the Krasnaya-Moscow line and two on the Moscow-Charukov line. Two planes are always kept in reserve, one at Moscow and one at Krasnaya. The Dershaft Company operates the Krasnaya-Moscow route with its own planes and own organization. The Moscow-Charukov line is operated in cooperation with the Russian Company, the Kharkovskiy. The Krasnaya-Moscow service is a joint flight of the Dershaft and Left Moscow and the whole line is operated in both directions each day, covering a total daily mileage of 1,000 miles. Nine pilots are employed and each pilot always flies the same plane, except in case of emergency. Every plane also has its own mechanic who makes all flights in the plane.

This has proved to be an excellent arrangement, the pilot and mechanic take great pride in the up-keep of their machine, know its possibilities and are paid by its output. As only eight planes are in service, one of the same make and in similar to others, in reserve. During each month, every pilot flies 8,000 miles and undergoes a medical examination during every month that he is flying.

The line is subsidized by both the Russian and German Governments. The company has endeavored to make the air traffic pay its own way and hopes with the development of the larger airplanes, and the use of the engines of less weight, or by using cheaper fuel, that the line can be put on a commercial basis. On October 31, 1926, the Dershaft completed



Multi flying plane ready for Moscow flight in Transpolar Field Series (Transpolar Journal)

its first flying season. Three hundred and fifty thousand miles were covered on regular schedule during the flying season, commencing May 2 and ending October 31. The passenger, freight, mail and parcel loads showed a steady increase during the monthly operations. The mechanical results were very satisfactory during 1926. During the period of operation, there were but six forced landings and in only one instance was there any damage to the plane. There was no damage to the engine. The regularity of the performance was 98.7%. In 535 trips during 1926, the Dershaft carried more than 3,100 passengers and the total of 223,669 kilograms of baggage, goods and mail. The outcome right to operate air transport planes between Moscow and Krasnaya-Moscow is to be held by the Dershaft Company, which later will operate between Berlin and Moscow instead of only the Krasnaya-Moscow section of the air route.

#### Other Russian Airlines

There have been a number of other air lines operating in Russia, some of which have maintained regular schedule flights for several years. Three companies besides the Dershaft have operated during the last few years, the Dershaft, the Kharkovskiy and the Zakavskiy. The Dershaft operates all metal Dornier-Wal 2's and operates as far north from Moscow to Tver, connecting the Capital of Soviet Russia with Berlin. In addition to this route, the Dershaft has gone from Tver to Vysny, on the Chasov Grouper and operates a regular service between Krasnaya and Krasnaya. The Zakavskiy operates from Tver to Vysny, the Capital of Soviet Russia. The Kharkovskiy company has a capital of 2,000,000 rubles and operates 13 airplanes and covers a route of 2,000 km. (1,200 mi.). It operates between Moscow and Krasnaya, Krasnaya and Odessa, Krasnaya and Rostov and Krasnaya and Kiev. In 1926, from April 25 to July 1, 131 flights were made and 308 passengers carried. Two mail trips were made a week over each route.

Great management has been given to the development of both commercial and military operations in Russia by Aviatik, or the Society of Friends of the Air Fleet. This organization has more than 20,000 chapters and over 4,000,000 members. Each member contributes a small sum and the money is used for the purchase of airplanes, for the con-

struction of flying schools, a score of planes have been presented to the Soviet Government. To place every important city of Russia under its military planes and the members can give demonstrations. The propaganda work has created an intense interest in all aviation matters in Russia and the spread of ideas of even the poorer people is a remarkable evidence of the growth of aviation in Russia.

#### Aviatik Has 4,000,000 Members

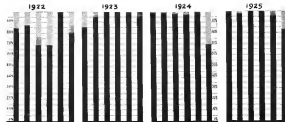
The association was formed by combining the Society for the Advancement of the Air Fleet, and the Society for the Advancement of the Chemical Industry which was originally founded by Tsyndat. For technical reasons the two societies were merged in July, 1925, under the name of the Aviatik, under the leadership of A. Rogoff. The Directorate of the Aviatik is composed of fifteen members. The association has undertaken the task of organizing, its rapidly and progress in chemistry and aviation, special attention being given to propaganda stressing the importance of flying. That the Aviatik has been successful in this is shown by the fact that as the result of a few years it has grown to 4,000,000 members. About 500 aircraft of various types have been built, and a large number of propaganda flights were successfully carried out.

#### Future Flights Promoted

In 1925, the Aviatik organized the Berlin-Tokyo flight in which five planes started and all of them except one, which had a forced landing near Paris, reached their destination and made the return to Moscow.

Recently the Aviatik created in establishing a World record in connection with the flight of Evans and Wells from New York to Paris, when the Russian official pilot Kopylov overtook the Trans-Atlantic express train in a twenty-five hour flight between Moscow and Omsk. By means of this flight, Evans, Evans and Wells recorded in making the record the World record in 28 days, 54 hrs., 36 min., bettering the previous record by over 7 days.

The Aviatik in 1926 arranged four international flights. The first to Tver, by way of Krasnaya-Moskovskiy and West-Balk, and return; the second to Moscow-Krasnaya-



Regularity of service of Dershaft. Black indicates compiled flights, Redwood cross lines shows data is not shown, left in right diagrams, data due to weather conditions, right to left diagrams, data due to failure. Each column represents a month from May to October.



View of Berlin looking directly down on the Reichstag and surrounding buildings.

Berlin-Prokitten-Potsdam and returning the third from Moscow to Angers via Chartres and Le Mans. This trip included crossing the Rhine from Rotterdam.

The fourth trip was Moscow-Berlin-Potsdam-Venice-Florence-Rome-Moscow.

On the occurrence of the landing of the *Aviation* on July 12th, a parade of airplanes took place on the Tivoli

Central Aerodrome. On that anniversary there landed propaganda flights by approximately 200 airplanes, the trip being made to the various cities and national and regional centers of the Soviet Republics.

During the summer of 1935 an experimental flight was made between Moscow and Paris, across the Pyrenees. This flight was said

(To be continued—next week, Moscow flight)



The Free City of Berlin, the first stop on the Berlin-Moscow flight.

## The Present Airship Situation in the U.S.

Commander Rosendahl Addresses Tax Beta Pion Airships

PUTTING IN a strong plea for the maintenance of airship work in the development of rapid transport for both national defense and commercial purposes, Lt. Comdr. Charles E. Rosendahl and a very interesting lecture, Feb. 9, before the members and guests of the Tax Beta Pion chapter in the new clubhouse at the Engineering Society Building, New York City. Mr. E. D. Miley presided at the meeting and introduced Commander Rosendahl as the senior surviving officer of the ill-fated *Lexington* blimp, and one of the best authorities on rapid airship operation in the United States.

The lecturer then opened his remarks with a brief popular introduction as to the possibilities of rapid airships. This outline, which may well be described as 90 or 95 per cent layman, he explained the area in which rapid airships had already been put and mentioned some of the outstanding performances, such as the pre-war German operation of the *Zeppelin* ships between Berlin and Friedrichshafen, during which as few less than 37,000 passengers were carried; the memorable wartime flight of the *USS* from England to Germany; the very fine performance of the *Goodyear* in its commercial cruise of sixteen days duration, during which the airship flew from Baltimore to the West Coast and took part in maneuvers at the Pacific Fleet. On this occasion, the *Goodyear* was away sixteen days and was accepted as temporary mail at all times when it became necessary to make contact with the north.

Commander Rosendahl mentioned a number of other outstanding airship flights and then showed an extremely interesting moving picture film taken in Germany, depicting the development of the *Zeppelin* type of airship from its earliest stages to the completion of the *USS*, which flew to the country from Berlin and is now the *USS*. The lecturer then entered upon a discussion of the problems which had to be met before the large rapid airship might become recognized factor in the national defense and a reliable air transport vehicle. Commander Rosendahl informed that Navy ships of the size and character of the *USS* would require very extensive bases in long range oceanic work at sea. He emphasized, however, that a lack of operating bases was not a serious problem.

One of the major arguments in the satisfactory development of the moving base, said, in the conclusion, Commander Rosendahl is of the opinion that the best route to present in use, will not prove satisfactory, owing to the fact that it is really situated in such a manner as to make the most possible use of the airship. From the standpoint of rapid airship operation, these weather conditions usually occur at heights of approximately 100 or 200 ft above the ground and an airship commander, rather than risk not a storm, will be in a position to make it that height would take the air and be ground until weather conditions improved. This, of course, is a great disadvantage and must be remedied. Commander Rosendahl believed that what he called "weather control," capable of moving an airship as fast as it will be done in the ground, will be the type which will prove satisfactory in overcoming the problems of violent weather conditions. In

using such a route, the storm of the airship would be maintained relatively, but possibly the risk of a storm would be increased, possibly by the wind direction. Experimental work on this question, he said, is being carried out by the Navy.

Another problem, which is of permanent importance, Commander Rosendahl said, is that of the design of large airship hangars. At present the tallest ship hangars around hangars is a source of considerable trouble when mounting airships on the ground, and especially in and out of such hangars, and the speaker believed that a hangar which would be designed of such a form as to reduce to the minimum the danger of a violent storm. He pointed out the possibilities of building hangars, such as the *Zeppelin* hangar used by Gen. Rosendahl as the *Goodyear* during the early days of the experimental work.



Lt. Comdr. Charles E. Rosendahl, U.S.N.

Commander Rosendahl explained the great importance of defense in airship operation, emphasizing the fact that there was little or no future for the use of airships in the development of water or air transport, however, with the advent of the present high speed and limited availability, the problems of its employment were very considerable and led to the development of water or air transport, which presented the combination of water from the extent of the engine, which necessitated considerable expense for the maintenance of the ship due to the consumption of fuel. The lecturer pointed out that from 100 lb. of gasoline consumed 140 lb. water of weight, which had to be carried and he used the experience, which had been developed by the Navy, which at approximately 90 per cent efficiency, although he mentioned that when flying in a fog it had actually worked at 115 per cent efficiency. The use of water as a power source enabled the construction of defense gas being light and was a necessary addition in all airship employment. The lecturer discussed a number of other problems, including those of airship design and he used the experience of the *Goodyear* and the *USS* to illustrate his points. Mentioning structural details, he said that experimental work had been carried out in a substance known as *Cellulose*, which would replace the gold-brown skin which is now used in the construction of airships. The use of *Cellulose* was described as a translucent, brittle material similar to that used in the wrapping of *cellulose*.

**Light Alloy**  
The use of *aluminum* in the construction of rapid airship hulls, of course, became almost essential, although Commander Rosendahl drew attention to British practice in use of their new *USS*, in which a combination of *aluminum* and *steel* was being employed and in this connection he believed that a certain amount of *aluminum* was made use of. Commander Rosendahl further drew attention to a new light *aluminum* alloy, known as *Aluminum*, which he said was 10 per cent lighter than *aluminum* and showed some promise of being used in future rapid airship construction.

In closing the lecturer mentioned the fact that the *USS* was the first airship to be built in the United States and that the construction of experimental work in the rapid airship field



## Letters To The Editor

### The Cost of Single Engine Plane Operation

To avoid that there could be no confusion about it, we gave the papers the detailed items making up these costs so that anyone familiar with accounting could see that no charges had been included for other than direct expenses.

### An Examination of the Mail Beds

To the Editor of *Aviation*[illegible]

order not to be a money. If such a line sought to develop passenger and express carrying, as well as mail, it would have a very good margin within which to determine its passenger and express rates in order to develop as much traffic as it could. It is a fact that the express rates of the express companies are a tip of 90 per cent. It would have it a heavy charge on how to \$150 per ton for the 100 lb. of express and passengers before it would begin to lose money. In other words a line carrying about 100 lb. of mail of the express would be a very good business. It would be a very good business for passenger and express. And the more mail it carried the better it could make its rate for passenger and express, if it had to be built up in two lines of traffic. Transportation rates making always results in rates that have a bearing

[illegible]

### New Distance World Record

The National Aeronautic Association has just received notice from the Federation Aéronautique Internationale that a new World record for airplanes, established in accordance with F.A.I. regulations, has been recognized by that body as follows:

[illegible][illegible]

### N.A.A. Will Protest F.A.I. Regulations

The contest committee of the National Aeronautics Association has agreed to protest against the regulations of the Fédération Aéronautique Internationale, which credited to the United States the two stratospheric speed records of Major Harold G. Gatty of the Royal Canadian Air Force, made at Hampton Roads, Va., during and after the Schneider trophy race, last November.

The committee, of which Cordia Wright is chairman, will notify the American Association's representative in Paris to recommend that instead of the present regulation, which states an aircraft record goes to the country in which it is made, a new one be substituted, crediting the record to the nationality of the aircraft.

### Australian Flight Record

Captain Johnston, of the Royal Australian Air Force, recently set up an Australian record for a one day flight. He covered the 1,308 miles, Long Beach to Melbourne, in 10 hours.

## February 14, 1927

### Details of the Air Mail Routes

*Wm. B. Oliver of Alabama Gives Congress a Statement of the Present Situation.*

During the debate on the Past Office Departmental appropriation, Mr. Oliver gave the most complete summary of the War Medal claims that has been made. The costs and expenditures at and on the status of the fighting situation will be found to be very complete.—Eo

MR. QUINN of Alabama. Civil action is a language of great importance in commerce and participation in national affairs. The Congress goes through to that fact in the various bill passed in May but just before the summer adjournment. In the bill appropriations were authorized, and the Department of Commerce, through an Assistant Secretary of Alabama, was allowed, for the purpose of reconstructing and restoring civil service, to find places to civil from and places to go by with clerical staffs under contract, transfer and provided with necessary working tools properly assigned, to render efficient aid in public service.

In fulfillment of the legislative purpose the delivery bill of \$200,000 carried an initial appropriation of \$100,000. \$100,000 of which was for navigation facilities and the balance for portland pay. The pending bill carries \$2,504,195, \$200,000 of which is made immediately available.

[illegible]

## MAP OF BATTERY LIGHTS

[illegible][illegible]

This international route from New York to San Francisco is scheduled to begin in 1961. From New York to San Juan, C.R., and is now operated by the Pan American Department. However, this line has been reserved which will be used to carry to private contractors as to shortly after July 1961.

[illegible][illegible]

The department is considering taking out of the 1998 appropriations bill credits July 1, 1997, the following: San Francisco Lake Delta, the delta now operated by the Port Office Department; the portion of the San Anselmo Lake delta, 101 miles, transferred to San Luis Delta; now owned by the Port Office Department; Delta will complete the lighting of the delta; that portion of the Delta-Puerto delta, 214 miles north end

[illegible][illegible]

RATES BID FOR AIR MAIL CONTRACT

As an illustration of how readily public opinion is developing a preference to these (and) other tax (and) other New York Tax Changes, while in the state system of the unemployment, and the maximum net annual salary for the system was \$1 per year, a number of bills were introduced, including one that was \$1000 per year, the low \$1000 bill was \$100 per year, another bill with a salary cap, and a salary cap of \$1000 or a year of \$100. It will be very clear that any such bill is a very good one.

**MR. KELLY:** The problem, undoubtedly, when I saw the Government was not the difference between the MI and SI, but I think probably a similarity in the Post Office Department. The SI and SI-1 members, I don't know where I made even in the Post Office Department, which is a Post Office Department right in here. Now, if the cost of \$175, the estimate in understanding the Post Office Department in a large extent.

**MR. GUYER:** Unfortunately that will not be adjusted to these tax law tax breaks. You mean that somebody pays taxes about what the savings will be, and then offset the entire savings. In other words, if you didn't implement reported as you know, something you can cut half million dollars last year and generated back about \$100,000. That is not the Government more than \$1,000,000 to provide the service.

40. REPLY: But my friend thinks we are going to change that law  
+ Government speeches to a certain state. We expect to pay \$4  
good for the earnings of \$, but with a lot of \$10, that means a real  
day to the Post Office. 20440000.

Mr. GUYTON. If the gentleman will permit, I shall be glad to discuss that feature later when we take up the appropriations. I simply desire to state what that feature authorized in the bill regarding some relations for the Post Office Department there would have been paid for this service as work at \$5 per period. Under the bill as amended there will be paid a lower rate and the rate now is as low as could be.

The only member of present party in youth is the Rev. Dr. Lee, formerly of Salt Lake City and that has sold from the temple. The two Mrs. Chicago have been absent from the party, and the American Society having this matter in charge has the water has been increased the holding of their party—and presumably all of it will be increased before July and the the members early members—the persons in that name who probably is finished, if not finished, and great public attention.

BY KELLY: The ordinance has said that those contractors are going to chambers of commerce to find out about the ordinance. The ordinance said they would be provided for the meetings. We provided that the agencies would work in a coordinated lead to the ordinance meeting is up to us and all of 10 weeks on either side of March 20th at 11:00 a.m. The ordinance has stated that that prohibition can be enacted to those who

Mr. OLIVER. It would be the best if it is a wire policy to at least relieve the Government of a government portfolio and of a national portfolio.

Mr. KELLY: If the gentleman will permit another observation, a number of the names shown on the map are being merely story tags, some of them on a large island, because there is not the air mail to stay the evidence of having the necessary planes. If that does the evidence, we

Mr. OLIVER. There is still one or two, when, perhaps more interest was shown in the matter of getting the bill and this is reflected in the increased number of bills introduced. There are just a few things that should be mentioned in connection with a comment you make as to increased business. It should be properly pointed out it should be well attended, and if you can then provide for it although substantially occupied.



## Slotted Wings in Practice

In Spite of Favorable Test Results, Practical Use of Slotted Wings not Very Extensive.  
Two Successful Handley Page Machines Described.

THE THEORY of the slotted aileron, of which so much was expected when it was first expounded some years ago, appears to have remained dormant, in spite of its promising aspects. It will be recalled that not long after the War there was what might be designated as an episode of dominance of the revolutionary possibilities of incorporating the slotted wing principle in both military and commercial aircraft, and yet little has been done in this direction.

Shortly after Harry Lachmann and F. Handley Page presented this theory about simultaneously, the compound wing, in its various forms, became the subject of experimentation in many of the leading aeronautical laboratories all the world. The promising results obtained from these experiments only served further to emphasize what could only be regarded as the tremendous possibilities of compound wings in airplane design. Much surprise has, therefore, been expressed in many aeronautical circles because of the apparent disregard with which designers have treated these important results. One or two machines have, however, been produced, incorporating these new principles, among which may be mentioned the Albatross and one or two machines produced by the Handley Page Company in England.

### Tests Show Promise

As demonstrated by wind tunnel tests, the addition of slots to any wing surface has the effect of increasing the lift of that wing, the extent of which increase depends upon the perimeter wing surface and upon the number and form of slots. It will be clear, therefore, that the advantages due to this increase in lift may be realized in different ways in the design of an airplane. Employing a single slot and a trailing-edge flap, the lift coefficient of a wing may be increased from 75 to 140 per cent, depending, in already com-

puted, upon the wing surface used. Taking the case of a machine of a given total weight, maximum speed and wing area, the addition of the slot system will have the effect of reducing the landing speed, owing to the increased lift afforded with the slot open, the top speed remaining the same with the slot closed. It has been found that a reduction as high as 30 per cent could be obtained in this way. From this it is evident that the take-off and landing runs will also be considerably reduced and the angle of climb increased.

On the other hand, assuming that the total weight of the plane and the landing speed are to be retained constant, the employment of slotted wings may result in a marked reduction in the wing area necessary—a reduction proportionate to the increase in the lift. In the case of a machine designed with this object in view, the overall wing loading will be increased, with the result that there will be an increase in the maximum speed. Thus it is to say with slots closed, although it should be remembered in such cases that the maximum ceiling may be reduced. The scale effect on the model tests is, however, marked and it seems likely that it has been owing to this fact that more use has not been made of the slotted wing principle in practice.

As already mentioned, the adaptation of the slotted wing principle to airplane design results in a marked decrease in the landing run of airplanes, and, therefore, it is reasonable to suppose that there may be some advantage in employing slotted wings on airplanes which are to be used on shipboard. With this object in view, Handley Page, of Oriskanywood, London, produced the Handley Page Hendon, largely entirely fitted as a single-engine plane, designed especially for operation from the deck of a seaplane carrier, its outstanding features being the ability to take-off in a very short distance, and to carry a heavy torpedo and still maintain the favorable



The Handley Page Hendon, five-passenger carrier plane equipped with three 450-hp. Bristol Liza engines, recorded initial success. The new landing and raising apparatus are clearly visible. Landing the aircraft seems able to open the trailing edge slot.

form of take-off and landing run. The Handley Page Hendon actually came off the British Air Ministry's "usual bag," about the middle of last year and since that time several machines have been constructed and another experimental plane of similar type put under construction.

The Hendon is a normal biplane, equipped with a Napier-Liza engine at 450 hp. It is a two-seater, with a total loaded weight of 6,000 lb. and a wing area of 800 sq. ft., a figure which will immediately appear as rather low compared with the weight of the plane, but which is rendered possible by the slotted wings employed.

### The Slot Arrangement

A description of the slots will be interesting. The wings are of normal type with flaps extending along the entire leading edge. The outer extremities of these flaps on all four wing panels are capable of being opened separately or otherwise. The flaps and ailerons are so arranged that when they are depressed a slot in the hinge automatically opens, permitting the airflow to pass through and over the upper surface of the flap. The leading edges of the wings also have a slot extending over the entire span and forward of single main-sparing section. As in the case of the trailing flaps, the leading edge slot is also divided in such a way that the outer extremity automatically opens and closes with the lowering or raising of the ailerons on the two sides, respectively. The inner extremities of both the trailing edge flap and the leading edge slot in each wing panel are operated by the pilot in a separate cockpit, for the purpose of changing the lift coefficient of the wings.

It will be seen then that in the Hendon is included a system of linked control which enables the slotted principle, together with a system of flap raising and lowering, the lift coefficient with the resultant change in the stalling speed of the plane. It will be readily apparent that, due to the great changes in lift resulting upon the opening and closing of the slots, the incorporation of the slot principle in the

normal lateral control motion of an airplane will result in the larger changes in rolling moment, and, therefore, in take and control, than would be possible with normal ailerons. A close examination of the accompanying photographs will give a clear conception of this slotted system incorporated in the Hendon.



A closer view of the slot mechanism of the Handley Page Hendon.

How the device controls wing flap.

late last year, the Handley Page Company produced another machine, incorporating slotted wings, known as the Hendon. The machine, however, is a four passenger, three-engine, conventional design of the monoplane type. Apparently, it was originally intended to produce a metal carrying airplane, but the machine was finally fitted as a passenger plane and has a good value with ample room for the four passengers, with pilot and mechanic occupying an open cockpit in the rear of the plane.

(Continued on p. 332)



The Handley Page Hendon, shipboard torpedo carrier (Hendon class 450 hp) climbing steeply on the take off with the wing slots open.



A close view of the Handley Page Hendon (Hendon class, see p. 328).

# PICTURES THE NEWS



**PIERCING THE NIGHT.** The searchlight beams are visible at the head, stern and bow of the ship, looking for the light from the ship. The ship is the 'KAWAII'.



**A HAVEN FOR AIRCRAFT.** An aerial view of the ship, the 'KAWAII', is shown. The ship is the 'KAWAII'.



**OF HAWAIIAN FLIGHT.** The ship is the 'KAWAII'.



**POURING THE AIR.** The ship is the 'KAWAII'.

**SAFETY PRECAUTIONS.** The ship is the 'KAWAII'.

**OVER THE SHOWN SCREEN.** The ship is the 'KAWAII'.

**AUTOGRAPH.** The ship is the 'KAWAII'.



Underprint 400. Underprint 400.



## Side Slips

By ROBERT H. GORDON

Seeing that the Fokker monoplane, in which Morris Byrd and Bennett went to the Pole, will be placed in a museum which Mr. Ford is establishing at Dearborn, Mich., and also noting that the American-Elwood-Skanebe plane is still floating in the only pond, we are wondering what placed will be given to the Skops when that ship is placed in a museum. We think it could be shown in one of the famous fighting ships of the twentieth century.

By the way, wasn't one of the primary purposes of the Norge's flight to promote unity among the nations represented in the crew?

All of the flying fields seem to be in terrible shape because of the recent snowing, raining, freezing and thawing, and a number of friends have reported that the experience they obtained in Philadelphia's Mott Field during last year's snow, has stood them in good stead. Mr. H. C. reports that he walked out into a puddle recently, at a large Eastern field, to recover what appeared to be a good pair of goggles and a helmet floating around. As he was about to pick them up he found they were being worn by a man who was trying to jack his plane out of the puddle where he had just landed. Close inspection of this story will reveal that it is a combination of the harem-circus-madness, as the story which seems to have had its origin during the Civil War, but we are so short of material this week we would print almost anything. Just at present we have not the slightest idea what to run for the rest of this issue, but we must fill it with something. If we ever let in much

as an such ship by accident we would never recover it from the Advertising Department.

The newspapers state that the King and Queen of Belgium are very fond of flying, and do quite a bit of it, and we might be able to swing some sort of a comment out of that line. For instance we could say that if they had an Ana for a guide, there would be possibility of a high straight wheel might be worth a try-and-draw, especially when one considers that it usually takes a timeout or some other path to get a flight. However, this is pretty poor stuff so we had better end our. On second thought, now that it is down on the paper, we might as well let it ride.

Most of the airplane companies appear to be well equipped with orders at the present time, and in a fairly prosperous condition. The last indication we have of this is the fact that all of the stockholders, engineers and company officials are walking around with huge frowns and expressions of deepening despair. Whenever a ship goes in joyfully and efficiently, and starts taking in huge figures about the future of aviation, we are sure he has no order in his history and has these sales to meet at the bank within a week.

One reason we are short of material this week is that California has fallen far behind Waco, Tex. in the race for newspaper material. Usually we can count on the California team to think up at least one new short neck work, which is featured in the newspaper, and which sometimes arrives a thought or two. Lately, though, there has not been a word out of them. Waco has been credited with the man who landed 1904, knocking a pin in half on his first mile, and with the development of a sixteen barrel two cycle and four legs, suitable for landing homes. This puts Waco two points ahead in the competition, and it is about time California did something about it or we will be also a several next week, too.



THE FORD ALL-METAL TRANSPORT MONOPLANE

Powered with three 200 h.p. Wright Whirlwind Engines

Equipped with

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The Pitcairn Orowing incorporates an unusual combination of desirable elements for successful commercial operation, with a low maintenance cost and an initial investment of only two thousand dollars.

Complete Description on Request

**PITCAIRN AIRCRAFT, INC.**  
LAND TITLE BUILDING PHILADELPHIA

# AIRPORTS AND AIRWAYS

## Portland, Ore.

By Dick Phillips

The most important event in local aviation circles was the recent reorganization of the Aero Club of Oregon. There and those interested in aviation gathered at the Chamber of Commerce and discussed the following officers: Father Adam, president, John G. "Doc" Barker, vice-president, Paul Young, treasurer and Don R. Phillips, secretary. Neil Evans and James Henshaw were elected inspectors.

There are several projects which the club hopes to carry out this year, one of which is the dedication of the new Portland Airport. This airport, when completed, will have facilities for both airplanes and seaplanes and will be 2,000 by 4,000 ft. The field will be completely equipped with landing lights and other facilities for such things. For the dedication, the club plans to host a Portland race with a prize sufficient to attract pilots from all over the United States. Twentieth place will be a three day race.

The club plans to build a large clubhouse on the field with a dining room for pilots and friends.

The main reason for the reorganization of the club is to permanently establish landing fields marked and equipped in every form of importance in Oregon. In a year's time the club expects to have one hundred fields marked and located in Oregon.

A special invitation to visit is in offered any pilot passing through this section of the state:

## Ypsilanti, Mich.

By Ralph Denney

An announcement has been made that has caused the enthusiasm of local fliers and has given them something to work for during the next few months. With the acquisition of the new municipal landing field, the City of Ypsilanti has decided to hold an air meet from July 2 to 4, inclusive. E. A. Goff, of Lansing, Mich., who presented the Ypsilanti Creek tract two years ago, has been placed in charge of arrangements, and with such an early start, it is believed that the meet will be a complete success.

## College Park, Md.

The model radio beacon installation, being made by the Bureau of Standards, is almost complete. Tests made on the ground showed the beacons to be functioning properly. A trip was made to inspect the beacons of the Ford Airport, at Dearborn, Mich.

In connection with the testing of receiving sets to detect radio beacons, a number of a suitable size for aircraft use, several types of receiving sets have been obtained. To facilitate the work on these and the aircraft radio beacons in general, arrangements were made with the American Telephone and Telegraph Company for the use of station WCAP as the ground transmitting station. This station is eight miles from the College Park aviation field, and a telephone extension line

is being provided so that the operator may talk to the pilot directly from the aviation field.

## Galena, Ill.

By E. H. Worsick

Galena, Ill. new lands of a first-class flying field. This country, long famed by pilots because of the many hills and the extremely rough formation of the land, is now varied almost fully by the many planes in this part of the state, as well as active, lawn and pasture Wisconsin.

The field, owned and operated by W. McElroy, has been an aviation for two years and is now complete in every detail. The landing field consists of fifty acres and is square with a gravel ridge toward the center, thus allowing a fair landing in any wind. A two-plane hangar is located on the field, fully equipped with repair and machine shops. The field is lighted with flood lights, making night landings possible.

Mr. McElroy is a devotee for the West aviation.

## Montreal Park, Cal.

The San Gabriel Valley Airport, operated by Arthur W. Collins, is located twelve miles East of Los Angeles, on a concrete highway, and two miles Northwest of H. Markt, which is the end of the Route No. 10. The field is 2,000 ft. long, ranging North and South, and 600 ft. wide. There is a parking northwest wind. The field is equipped with a navigation wind cone and weather and all are available.

At the present time a JN-4B, with an OX-5 engine and a Cessna, powered with an OX-5 are now being operated and used in the flying a Waco 9 will be added. George Hiley is pilot and Arthur W. Collins instructor.

## Detroit, Mich.

By Ralph Denney

There is a statement on file, headed by strong local sentiment, which has as its object the placing of Detroit on the Transcontinental Air Mail route. It is the opinion of those who favor this move that it will alter the present schedule only two minutes. City and post office officials have made a

strong attempt to keep the short through, radio talks, no doubt in the way to increase the business done by the movement to show the public the advantage of the air route.

Following the announcement that Fordham Field had been leased to Edward C. Kapp, the Michigan distributor of Waco for the summer season's flying activities, comes the news that the field has been sold to a real estate firm and will be subdivided next Spring. Another good field gone wrong.



One of the Trans Airs being used for summer touring by the Aerial Corp.

## Night Flight over New York City

On Jan. 25 a passenger and mail plane, of the Colonial Air Transport Company, cruised for an hour and a half 5,000 ft. above Broadway and adjacent streets. The plane contained

# Announcing HAMILTON DURALUMIN PONTONS FOR SEAPLANES

Prompt delivery on pontoons for three to four thousand pounds airplanes. Other equipment includes flying boat hulls — wing floats — skis and floodlights made to order.

Let us quote on your requirements.  
**HAMILTON AERO MFG. CO.**  
60 KEEFE AVE., MILWAUKEE, WIS.

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Contractors or Direct Sales Commission

## Liberty Guaranteed Aircraft Motors

Stub tooth gears, Ohio pistons, latest type used by the Air Mail

Now, \$1200, Used 20 hours, \$975

These motors were bought from U.S. Air Service and overhauled

Liberty 12 cylinders, \$25.00, overhauled, \$14.50, complete Delco heads, \$20.00. Large lot of parts cheap. Liberty 6-cylinders, \$25.00, new and complete.

**YACKEY AIRCRAFT COMPANY**  
Cleveland, Ohio, One Plane River and Remond Road,  
Four Park, Illinois, (which of Chicago)

**B. B. T.**  
LANDING FLOODLIGHT  
AIR MAIL TYPE

Will produce maximum illumination of 500 millions candlepower over your entire Airport.

Easy to mount, install and operate.

May be set to give more than the light every airport will eventually require!

**B.B.T. CORPORATION OF AMERICA**  
BOSTON, MASS. BIRMINGHAM, ALA.

**In the Service of U.S.A.**

They finish nothing about it now. They are one of the Army Air Service. They stop only one day "HITLER" before going up. And then as they are confidently with the "junk" attached, they begin to attack. Yet it's only his intent — if they and, or want it. And it gives them the excellent feeling of "ready for anything". Likewise with the U. S. Navy and U. S. Air Mail service.

Manufactured by  
**Irving Air Chute Co., Inc.**  
527 Main Street  
Burlington, N. Y.

Cable Address "Irving, Chute"

**IRVIN**

a pilot and three passengers and the flight was made for demonstration purposes.

The plane was a Fokker Universal, powered with a 200 hp. Wright Whirlwind engine. At 6:15 p.m., Capt. C. H. Middlecombe, former technical expert at the Baguville Airway, Ltd., at Great Britain, and now with the Colonial Air Transport Company, piloted the plane from the Victoria Airport, at Radstock Heights, N. J., and returned at 9:45 p.m.

The route the plane took was over Manhattan Island at 126th Street, down Broadway, turning Times Square, and the Metropolitan and the Warburton buildings. In landing, two Itagis three and a 2000/600/2000 c.p. final light were used.

#### San Diego, Cal.

Lt. J. W. Nelson, U. S. N., recently reported at San Diego from the Bureau of Aeronautics for completing the Flight Training School for Engineers of the Battle Fleet. He has been very actively engaged in coordinating the flight training course being given at the Naval Academy and the Air Academy at Hampton Roads with the course at this station. All his endorsements are carried on the status before it will smooth out a great many difficulties at present encountered.

Class Five of Student Naval Aviators reported on Jan. 10, and commenced entry training in the preliminary aviation instruction course, which, it is expected, will be completed before the first week of February.

### UNITED STATES AIR FORCES

#### Advocate Officers' Quarters at Scott Field

Construction of permanent quarters for officers, at a cost of \$200,000, at Scott Field, Ill., is asked in a bill recently introduced in the House of Representatives, by Representative Lewis of Maryland, Ill. The bill includes a provision for the sale of surplus Department of War property to pay for the cost of construction.



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School of Aeronautics  
in America**

For the first time in the history of aviation it is possible to learn thoroughly and completely training in all branches of aeronautics, in one school.

The Warren School of Aeronautics teaches more rapid maintenance and overhaul, engine construction, maintenance and repair, aerial navigation, aerodynamics, and structural work, all in one course, ground and air.

Our flying course includes construction and overhaul instruction and we instruct you on four different types of airplanes and you are a pilot after graduation of the school of Aeronautics.

Your success in aviation will be determined by the training you receive. None but the best is good enough—and we better train you here.

Write immediately for information on school conditions in Los Angeles, no deferred action, and full details of our special reduced price now in effect in a few minutes.

WRITE: DOPE!

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Los Angeles, Calif.

#### Washington to Pensacola With J-5 Engine

Lt. Col. Fred Davis, U. S. N. R., and Lt. J. H. Wooten, U. S. N., returned recently from an extended flight from Washington to Pensacola. This cross-country trip was made in a Vought T-3A plane, equipped with a Wright J-5 engine and a nine foot detachable blade standard steel propeller, adapted to have 2000 rpm. at full throttle in horizontal flight.

A careful record was kept of the fuel and oil consumption and the results obtained were very satisfactory. The engine was operated normally at 1600 to 1800 rpm. with intelligent use of the carburetor mixture control to obtain the best fuel economy. The average consumption with variable fuel was 20.7 gal. per hr. and with high test commercial fuel 13.3 gal. per hr.

During the trip to Pensacola, it is reported that a broken exhaust rocker was traced three of the cylinders to cut out, but the trip was continued with no serious result except a drop in the revolutions and an increase in fuel consumption. No trouble was encountered on the return trip, which was made in 9 hr., 52 min., and upon arrival at the place at Annapolis, it was corrected to a roughness and returned for service immediately with no adjustment to the power plant, save the small repairs necessary to the engine.

#### Air Maneuvers at Kelly Field in April

Extensive air maneuvers have been planned to be held at Kelly Field, Tex., in April next, and Brig. Gen. James E. Fulton, Asst. Chief of the Air Corps, will probably be in command. Some 200 planes will take part in the maneuvers, which will be the largest yet attempted in the United States. There will be attack and defense problems and bombing tactics. The present group from Selfridge Field, Mich., the attack group from Fort Crockett, Tex., and land-based and observation planes from Eastern states, will precede to Kelly Field. All types of planes will be in the maneuvers.



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Commercial aircraft operators realize the necessity and economy of an accurate engine temperature gauge.

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**PRIVATE OPERATORS** made the discovery that airplanes engineered to meet the exacting requirements of the **POST OFFICE DEPT.** were more economical to keep up and operate than many so called, "Commercial Ships."

Considering that the initial cost was no higher, it was well worth their time investigating the superiority of **RYAN M-1.**



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for Places Up to 3360 Pounds

### SEVERSKY AERO CORP.

Designers of successful aeroplanes, intraplanes, floats and landing gear for use on snow, land and water.  
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## American Aircraft Directory

Many inquiries have been received by Aviation for information regarding state laws, municipal ordinances, commercial policy, airports and aircraft operators throughout the United States. To meet this demand, the American Aircraft Directory will be published in 1927 in book form with many maps, illustrations and advertisements. As many of our readers wish the information immediately, there will be published each week, the data which has been received to date.

It is expected that many additions will be made and our readers are requested to send any corrections, additions or suggestions that they may have. Copyright, 1927 by Gardner Publishing Company.

### PUEBLO, COLO.

(Continued)  
Earl Puffer, c/o Colorado Storage  
12 South, 2425 N. Ave.

#### BUCKY FORD

Earl H. Zimmerman  
572-AMARAL OFFICES  
East End Garage  
Edna Jennings  
#742  
Ray Vaughn

### STATE DIRECTORY COLORADO SPRINGS

Commercial Field  
Location: NE of city.  
Description: 2,400 by 1,800 ft.  
Facilities: Repairs and supplies available.  
Buckley Field, owned by the Strubbe Aero Co.

Location: Adjacent city to the S, with hotel and lake on the S.  
Description: 4,600 by 3,200 ft.; Alt. 6,130 ft.; marked.  
Facilities: Hangars, and all accessories.

Brookside Ranch Field, controlled by Chamber of Commerce.  
Location: 3½ mi. SE of city, and E of State St. 311.  
Description: 1 mi. sq.; Alt. 6,300 ft.; marked.  
Facilities: Supplies available from city.

### DENVER

Ordinance regulating flying in the city.

FLYING FIELD  
Hawthorne Field, operated by Hawthorne Airplane Co.

Location: 4 mi. E of city, and S of Des Moines St. 101.  
Description: 1,200 ft. sq.; Alt. 6,250 ft.  
Facilities: Hangars, supplies and repairs.

Lewy Field, controlled by Colorado National Guard, address Commanding Officer.

Lewy Field.  
Location: 3 mi. NE of airport.  
Description: 2,000 by 2,000 ft.; Alt. 5,900 ft.; marked.

Facilities: Hangars, supplies and repairs.

SEE ORGANIZATION  
Berger Chapter N. A. A.

Charles Alfred Johnson, 1629 Fifteenth St., Pres.; Roger Rindler, Keller 1446; Sec.

### DURANGO

FLYING FIELD  
Commercial Field.  
Location: 1 mi. W of city.  
Description: 1,300 by 600 ft.; Alt. 6,000 ft.

Facilities: Supplies available in city.

ESTES PARK  
FLYING FIELD

Stanley Aviation Field, address Stanley Habel.

Location: 1 mi. from postoffice.  
Description: 2,500 by 600 ft.; Alt. 7,600 ft.; marked.

Facilities: Hangars, repairs and supplies in town.

### LAFAR

FLYING FIELD  
National Landing Field, address Secretary Chamber of Commerce.

Location: 2 mi. SE of center of town.  
Description: 1,600 ft. sq.; Alt. 5,100 ft.; marked.

Facilities: Supplies and repairs in city.

### LEADVILLE

FLYING FIELD  
Breckenridge Field, municipal.

Location: 1 mi. NW of city.  
Description: 3,200 ft. sq.; Alt. 12,200 ft.  
Facilities: Supplies available.

### PUEBLO

FLYING FIELD  
Masterfield Field, address Commercial Club.

Location: 2,200 by 3,200 ft.; Alt. 6,000 ft.  
Facilities: Hangars, supplies and minor repairs.

### TAHMAR

FLYING FIELD  
Bessett Commercial Field, address Bessett Aviation Co.

Location: 1½ mi. E, near hospital.  
Description: 1,000 by 2,000 ft.; Alt. 6,000 ft.; marked.

Facilities: Hangars, supplies in town.

### WILMINGTON, DEL.

Pilots and Operators

SEAFAR  
Bassett, Nell

NEW CASTLE  
J. B. Bays

WILMINGTON  
Atlantic Coast Airline, Inc.

### STATE DIRECTORY

WILMINGTON  
FLYING FIELD  
Bays Commercial Field, owned by John Bays, Newark, Del.

Location: 1 mi. SW of Wilmington, on Del. Road, Highway.

Description: 1,000 ft. sq.; Alt. 300 ft.  
Facilities: Supplies available nearby.

### DISTRICT OF COLUMBIA

#### Pilots and Operators

Clayton S. Law, Building Field

Mark H. Jones, c/o Bliss Electrical School

Wilfred A. Driggers, 3300 Ohio St., N.E.

Washington, D. C.

H. E. Hunt, P.O. Box 2545

Lo. C. V. Poling, Box 270, Pa. Ave. Sta.

R. Hensfield, Roundfield Avenue Co.,

1541 West St., N.W.

Victors, Ltd., Woodward Bldg.

### STATE DIRECTORY

FLYING FIELD  
Building Field, operated by Army Air Service.

Location: 1 mi. from Annapolis P.O., adjacent to Annapolis River where it enters the Potomac River.

Description: 1,600 by 600 by 1,600 ft.; Alt. 18 ft.; marked.

Facilities: Hangars, oil, gas, radio, telephone, telegraph, etc.

Annapolis Air Station, operated by Bureau of Aeronautics, Navy Department, for airplanes.

Location: SE of Washington, at junction of Potomac and Annapolis Rivers.

Facilities: Building facilities, steel hangars, oil supplies available.

### FLORIDA

Pilots and Operators

FLORIDIAN  
Charles E. Gordon, C.D.

Henry D. Lord

PORT MYERS  
Port Myers Flying Corp.

Oliver H. Vortick, P.O. Box 1654, (Shawnee-Livingston, Neb.)

NEALAN  
Florida Aviation Camp, Inc. Box 885 (Lake Wales, Fla.)

JACKSONVILLE  
C. D. Molinas, c/o Puckard Florida

Makia Co.

KEESWICK  
J. J. Baker

LAKE FORTY  
Walker & Morris

MAAMI  
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To have achieved Aeronautical Engine performance of the Pratt & Whitney "Wasp" and "Hornet" in such a short period of time, made imperative that every component be of highest quality and proven excellence.

That SRB Ball Bearings with Molybdenum Steel Balls were selected for the important parts is a tribute not only to their efficiency but to the experience and working of the Organization behind them.

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## The Aeroplane

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CHARLES GRET  
Editor

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1 year—\$8.50

## PUBLISHER'S NEWS LETTER

There is no hope of conversion to aeronautical circles that is discussed at the present time with so much interest and in some cases with such heat as the probable cost of operating aircraft and the amount per pound it is necessary for a company to incur in making a profit. The opening of the Transcontinental Air Mail route to bidders has brought the whole cost problem into the field of practical business instead of figures for publication purposes only. Looking back at the results of last year we only have one company that has not shown losses and it operated at the rate of \$3 a pound for a route of less than one thousand miles. Of the other companies that have operated at figures of \$3 a pound or slightly less, those have found it necessary to suggest operations temporarily or permanently. The P.T.T. steadily earned its books in the public and showed that in its line Philadelphia to Washington and New York, operated steadily as a passenger service, cost a mile to operate as three engaged planes and \$1.80 a mile including overhead. A dependent operator has produced a cost of 33¢ a mile for the operation of single engine air mail airplanes. Such was the situation when the air mail was opened.

Before the air mail contractors made their bids, a well founded rumor was circulated that any operator who secured the New York-Chicago route at \$2 a pound would earn a profit several hundred thousand dollars. The result of this talk must have been effective for there was no bid over \$2 a pound and the lowest was \$1.75. On the Western routes a bid for \$1.50 a pound for 1000 miles was successful and the Boeing Company and Eddie Hubbard, the earliest air mail contractor, received the route at a rate of \$1.50 a thousand miles. The route from New York to Chicago would be \$1.55 per pound. Because of the wide difference in the bids, Postmaster General and New did not award the Eastern route and has called for new proposals. The character of the tentative figures sent and the amount of weight factors are factors that caused such wide variation of bids and it will be interesting to note the range of the new offer. Meanwhile, several of the most experienced operators are protesting that instead of fostering the development of commercial aviation as was intended by the Kelly Bill, the policy of opening the post profitable air mail line to cut-throat competition is likely to bring about a crisis that will stop all the anticipated progress.

Everywhere there has been a noticeable decrease of costs of operation. The manufacturers of planes and engines are hammering down the costs to recover sales. Two of these advantages were given two years in AVIATION, but none to prevent their points of view. Another year they believe that "under certain conditions" an operating company can afford to make passenger rates materially less than 25¢ per mile, which

would mean a rate of \$56.25 between New York and Washington. If the public business objected to the idea that it can travel by airplane at anywhere near reduced ticket cost and thus finds what a line began the tabulation of passengers, then the costs are several times such figures. I believe we can expect serious and detrimental reactions. Further, the publication of such data will do credit aviation decisions regarding investment in air transportation companies, which would serve to produce a large crop of new investors fully and definitely would be considered aviation. We are still suffering from such crops previously generated from similar sort. This may truly warning from a person of wide experience, both in construction and operation is most interesting when one reads the debates in the Congressional Record.

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On January 27, Congressman Shivers said: "Is the greatest event of the fact that passengers are now being carried from New York to Washington for \$2 less than the railroad fare?" My Kelly, sponsor of the new Kansas Kelly Bill declared, "I was told that fifty cents less than the railroad fare, yes. The possibility of the air mail service can be estimated at this way." These statements were the result of figures given out to the press of a flight of a Wright-Bellanca plane to Washington and return from New York. The figures gave the cost per passenger at \$13.68 whereas the minimum railroad fare for the ten hour train trip is \$16.20." The cost of operation of the plane was put at 16 2/3¢ per mile in order to get an authoritative statement, a request for further information was made to the Wright Aeronautical Company and the completely appears elsewhere in this week's issue. It summarizes the whole matter when it states "We all know that the cost of operating an air line is two or three times the cost of the operation of the plane. The public, having been educated to the high cost per mile for operation, an air line, is naturally led to believe that the direct cost of operation of the plane is correspondingly high, whereas the reverse is true." As stated, in the letter, the figures were made public to show how these few private facts would be known and the comparison with the railroad fare was a comparison such as is made when a private owner takes a party of friends on an automobile trip and compares his cost per passenger with the railroad fare. The small cost of operating a line is very low but the charges range from 20¢ to 40¢ a mile. With all the air transport companies struggling for an opportunity to demonstrate that commercial aviation can be made a success, such widely differing methods of figuring costs must be confusing. Therefore they offer a rule course by allowing an ample margin for traffic education, small loads, controlled speeds, airport operation, delivery and collection, interest an capital investment, taxes, depreciation, obsolescence and insurance—L.D.G.

## Where to Fly

### CALIFORNIA

**THE RYAN SCHOOL OF AVIATION**  
O. B. RYAN, SCHOOL OF AVIATION, 1000 S. 10TH ST., LOS ANGELES, CALIF. This school of aviation is now open for enrollment. A few experienced students will be given opportunity in our shop, while waiting to fly.

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## WHERE TO FLY

CONTINUED ON FOLLOWING PAGE







# *Let's call it the -* **WACO TEN**

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TEN stands for the years the WACO organization, intact, has been *improving* airplane performance and utility for peace-time use.

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—combined with large roomy cockpits—practically no step required to enter—windshields that really protect—new seating comfort—accurate balance trimming in flight—elevators controlled without wires or exposed horns—four high aspect ratio ailerons independently and differentially controlled without wires or pulleys—beautiful enclosing cowling; not hand made but stamped in huge hydraulic presses, and easily removable in units—but

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